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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,507	04/06/2005	Pasi Tikka	14219-080US1 P2002.0843 U	5763
26161	7590	09/05/2006	EXAMINER	
FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			SUMMONS, BARBARA	
			ART UNIT	PAPER NUMBER
			2817	

DATE MAILED: 09/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/530,507

Applicant(s)

TIKKA ET AL.

Examiner

Barbara Summons

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2005 (pre-amendment).
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14-22 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/6/05.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 11 and 21 are objected to because of the following informalities:

In claim 11, on line 7 thereof, "the operates" should be -- that operates --.

In claim 21, on line 3 thereof, it appears that "or" should correctly be -- of --.

Appropriate correction is required.

2. Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 14 recites that the "second resonator comprises an LC resonator", but claim 11 has previously recited that the second resonator "operates with bulk acoustic waves" (see lines 7-8). Therefore, if the "LC resonator" is intended to be the inherent electrical equivalent circuit of the bulk acoustic wave resonator, this is not considered to further limit the claim 11 structure, and if that is not the intended meaning, then you would have a § 112 issue regarding whether the second resonator is a bulk acoustic wave resonator or an LC resonator.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-10, 16-18, 21 and 22 are rejected under 35 U.S.C. § 102(b) as being anticipated by Klee et al. U.S. 2001/0048352.

Regarding claims 1 and 8, Figs. 1-3 of Klee et al. disclose a filter apparatus comprising: bulk acoustic wave (BAW) resonators R1 and R2 in a ladder filter arrangement; each resonator having lower/first and upper/second electrode layer regions 5 and 7 with a piezoelectric layer 6 between the first and second electrodes (see section [0039], lines 35-37); and a capacitor C4 that is connected in parallel with the resonator R2.

Regarding claims 2 and 16, the resonators and capacitor are on a carrier substrate 1. Regarding claims 3, 4, 17 and 18, the lower/first electrode layer region and the upper/second electrode layer region are disclosed as being formed of multiple layers of different materials, e.g., Ti/Pt or Ti/Pt/Al or Ti/Ag, etc. (see e.g. section [0039], lines 37-47 and section [0092]). Regarding claims 5-7 and 21, the apparatus further includes, at the lower layer region, an acoustic mirror 2 that is formed of at least two alternating high and low acoustic impedance layers (see e.g. section [0065], lines 1-4 and section [0092]) with one of the layers being an electrode layer (see section [0065], the last three lines thereof), and instead of the acoustic mirror may include an air gap in the carrier substrate (section [0070], lines 1-4). Regarding claims 9, 10 and 22, the capacitor C4 is connected to only one resonator R2, and the filter apparatus is disclosed

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for use in a duplexer (i.e. transmitter/receiver filters) in a mobile telephone (see e.g. the last sentence of the abstract).

5. Claims 11, 12 and 14 are rejected under 35 U.S.C. § 102(b) as being anticipated by Shibata et al. JP 2002-217676.

Figs. 1 and 2 of Shibata et al. disclose an electrical circuit comprising: a stack of resonators comprising: two first BAW resonators a lower one of which is formed by lower electrode 40, upper electrode 46 and intervening piezoelectric layer 44, and an upper one of which is formed by lower electrode 52, upper electrode 56 and intervening piezoelectric layer 54; and a second BAW resonator that has a lower electrode 42 connected to ground, an upper electrode 46 and an intervening piezoelectric layer 44; and wherein an upper electrode 46 of the lower first resonator, and a lower electrode 52 of the upper first resonator are electrically connected to the upper electrode 46 of the second resonator. Regarding claim 14, the BAW resonator inherently has an equivalent circuit that is an LC resonator.

6. Claims 11, 12, 14 and 15 are rejected under 35 U.S.C. § 102(a) as being anticipated by Aigner et al. DE 101 49 542.

Fig. 3 of Aigner et al. discloses an electrical circuit comprising: a stack of resonators (being the left stack) comprising: two first BAW resonators a lower one of which has a lower electrode 124, an upper electrode 144 and an intervening piezoelectric layer 106, and an upper one of which has a lower electrode 144, an upper electrode 154 and an intervening piezoelectric layer 152; and a second BAW resonator

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that is part of a second stack (being the right stack), the second BAW resonator being, e.g. the lower resonator of the right stack having a lower electrode 104, an upper electrode 144 and an intervening piezoelectric layer 106; and wherein the upper electrode 144 of the lower first resonator and the lower electrode 144 of the upper first resonator are electrically connected to the upper electrode 144 of the second resonator which are all electrically connected to ground.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 19 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Klee et al. U.S. 2001/0048352 in view of Panasik U.S. 6,548,942.

Klee et al. discloses (Figs. 1-3) the invention with a layer of the acoustic mirror 2 being an electrode layer as discussed above. However, Klee et al. discloses only a

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protective layer 10 at the upper layer region and does not disclose an acoustic mirror at the upper layer region of the resonators.

Panasik discloses that it is known to provide an acoustic mirror both above and below BAW resonators, and that the one above provides a benefit of preventing the protective layer/encapsulant from damping the resonator vibrations (see e.g. the abstract, lines 1-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the BAW filter of Klee et al. (Figs. 1-3) by having provided an acoustic mirror at the upper layer region of the resonators (i.e. between the resonators and protective layer 10 of Klee) as suggested by the exemplary teaching thereof by Panasik (Fig. 4), because such an obvious modification would have provided the benefit not allowing the protective layer/encapsulant to damp the resonator vibrations as explicitly suggested by Panasik (see e.g. the abstract, lines 1-6).

Allowable Subject Matter

9. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ruby et al. U.S. 6,472,954 discloses connecting a capacitor 132/134 (Figs. 8-10) in parallel with a BAW resonator in a ladder filter/duplexer (Fig. 4).

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Aigner et al. U.S. 6,975,183 is cited as an English language equivalent of the German document applied above.

Clark et al. U.S. 6,943,484 discloses a BAW resonator with a choice of capacitors 34 (Fig. 7) connected in parallel thereto.

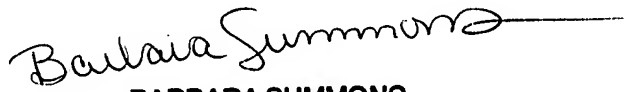
Klee et al. U.S. 6,653,913 is the U.S. Patent that issued from the published application applied above.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bs
August 31, 2006


BARBARA SUMMONS
PRIMARY EXAMINER